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HACKBERRY

. . . *an American wood*

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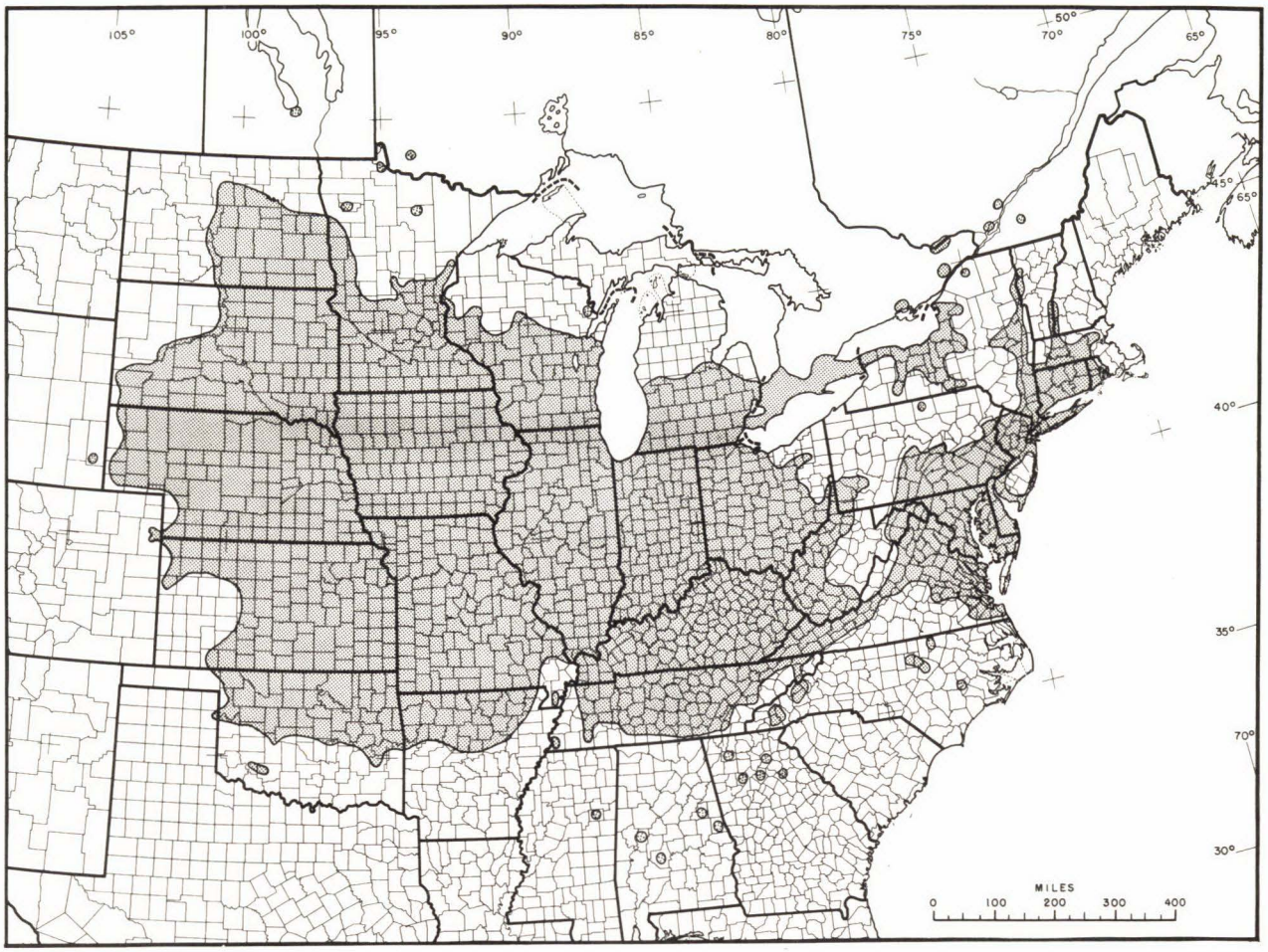

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Figure 1.—Natural range of hackberry.

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HACKBERRY

. . . *an American wood*

Glendon W. Smalley[1]

DISTRIBUTION

The name hackberry is commonly applied to two closely related species—hackberry (*Celtis occidentalis*) and sugarberry (*C. laevigata*). The natural range of hackberry extends from eastern North Dakota south to central Oklahoma and east to Tennessee, western North Carolina and southern New England. It is local in southeast Canada, Mississippi, central Alabama, and northern Georgia (fig. 1). Sugarberry ranges from southeastern Virginia to southern Florida, west to central Texas, and north to western Oklahoma, Missouri, southern Illinois, southern Indiana, and western Kentucky. It is local in Maryland, Rio Grande Valley, and northeastern Mexico (fig. 2).

Both species withstand a variety of climatic conditions ranging from humid to semiarid. Average annual precipitation varies from 14 to 60 inches with up to 20 inches of snowfall. Temperature extremes of 140° F. in the Great Plains are not uncommon. Variations are more moderate in the Southeast. The average length of the growing season varies from 120 to 250 days for hackberry and 150 to 270 for sugarberry.

Hackberry grows on a wide variety of soils. It does best in rich, moist alluvial soils, but will grow on almost any soil and with little moisture. Throughout most of its range it is commonly found on slopes and bluffs and frequently on soils high in lime. It is drought resistant and consequently has been planted extensively in windbreaks in the Middle West. It will not tolerate sites with a permanently high water table. Sugarberry is most common on clay soils of broad flats or shallow sloughs within flood plains of major southern rivers, but will grow under a considerable range of soil and moisture conditions. It is also common on deep moist soils derived from limestone—notably in the Alabama Black Belt.

Figure 2.—Natural range of sugarberry.

DESCRIPTION AND GROWTH

Mature hackberry is usually a small to medium-sized tree 30 to 50 feet tall and 18 to 24 inches in

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NOTE: This publication supersedes unnumbered publication *Hackberry*, issued 1945.

diameter. On best sites it may reach a height of 130 feet and a diameter of 3 to 4 feet. The trunk may be clear of branches for 30 feet or more. Annual diameter growth may be as much as $\frac{1}{3}$ inch. On the average it is much less, particularly in the western part of the range. Diameter growth is most rapid between the 20th and 40th years. On poor sites growth is very slow and the tree is frequently of small size, sometimes only a shrub. Sugarberry is generally taller, often attaining a height of 80 feet at maturity. On best sites dominant sugarberry trees grow in excess of $\frac{1}{4}$ inch annually. The overall average in natural unmanaged stands is between $\frac{1}{10}$ and $\frac{2}{10}$ inch annually.

Both species grow in mixture with a variety of other mainly hardwood species. Hackberry is a minor component of six upland forest cover types: Sugar maple—basswood, post oak—black oak, bur oak, eastern redcedar—hardwood, ashe juniper and Mohrs oak. It replaces sugarberry in the northern part of the sugarberry—American elm—green ash type, in which sugarberry is a key species. Sugarberry is associated with five other bottomland forest types: Cottonwood, sweetgum—Nuttall oak—willow oak, sycamore—pecan—American elm, black willow, and overcup oak—water hickory.

These two species bear good seed crops most years and light seed crops in intervening years. Seed production of sugarberry starts when trees are about 15 years old. Optimum seed-bearing age is from 30 to 70 years. Comparable data for hackberry are not available. Average germinative capacity of hackberry seed is 41 percent, for sugarberry 55 percent. The fruit ripens in September or October, and often remains on the tree until midwinter or later. There are between 1,580 and 2,380 cleaned hackberry fruits per pound and 2,000 to 2,400 for sugarberry. Seed is widely distributed by birds, less frequently by water.

Seed germinates early in the spring after lying on the ground over winter. The best natural conditions for germination are rich, moist, loamy soil. The two species are fairly tolerant in their ability to withstand shade. Early growth varies greatly depending on the degree of competition. Under heavy overstory the height growth of hackberry may not exceed 1 inch per year while cultivated trees in shelterbelts average 1.3 feet per year during the first 6 years. First-year growth of sugarberry usually produces a very slender but tough stem 8 to 18 inches high. Under shade the stem is typically short, crooked, and often forked. In the open it will be limby and short. Sugarberry responds to release. In dense, even-aged stands it prunes itself well and produces a straight stem.

Both species can be propagated by cuttings. Sprouts develop from stumps of small trees and fire-damaged seedlings and samplings. Stumps of larger trees rarely sprout. Few stands are of sprout origin.

These two trees form both perfect and imperfect flowers which usually appear with or soon after the leaves. The fruit, a thick-skinned, thin-fleshed drupe, is variable in size, form, and color. Usually it is subglobose or ovoid, and 1/4 to 1/3 inch in diameter. The pit is conspicuously reticulate. Sugarberry fruits are usually orange red while those of hackberry are dark purple or black. Hackberry leaves, $2\frac{1}{2}$ to 4 inches long by $1\frac{1}{2}$ inches wide, are simple, alternate, and ovate to ovate-lanceolate with sharply serrate margins (often entire below the middle) (fig. 3). They are glabrous or slightly scabrous above; smooth or sparingly hairy below. Sugarberry leaves are narrower than those of hackberry and usually have entire margins. The bark of mature hackberry trees is grayish brown with characteristically corky warts or ridges, later somewhat scaly (fig. 4). The otherwise smooth bark of sugarberry trees is marked by conspicuous warty excrescences.

Both species are relatively healthy and are attacked by comparatively few wood-rooting fungi and insects. The most important disease of hackberry is witches'-broom, which causes a rosettelike proliferation of the branch tips. The two species have thin bark and are highly susceptible to fire damage. While fire-scar decay weakens trees, making them subject to windthrow, it causes little cull before heartwood formation begins because of the high moisture content of the sapwood.

COMMON NAMES

Hackberry is the favored common name for *C. occidentalis*, but it is also called common hackberry, sugarberry, nettle tree, and false elm. Sugarberry is the name commonly used for *C. laevigata*, but the species is also called hackberry, sugar hackberry, Texas sugarberry, and southern hackberry.

RELATED COMMERCIAL SPECIES

There are five arborescent species and several varieties of *Celtis* in the United States, but only hackberry and sugarberry are commercially important. Woods of hackberry and sugarberry are generally

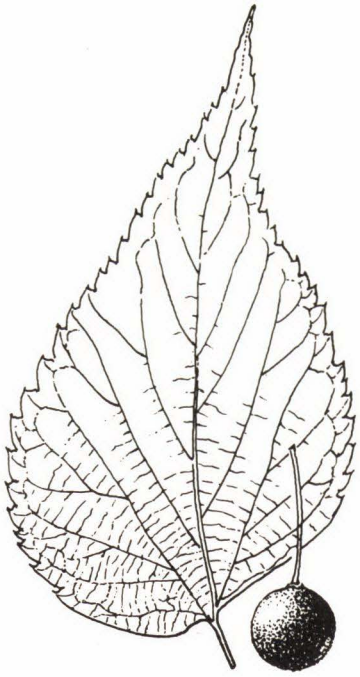

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Figure 3.—Foliage and fruit of hackberry.

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Figure 4.—Bark of hackberry.

indistinguishable. Lumber produced from both species is simply called hackberry and is occasionally sold as sugarberry or celtis wood. Hackberry lumber often is not distinguished from American and slippery elm (*Ulmus americana* and *U. rubra*) and white ash (*Fraxinus americana*), and is frequently used for the same purposes.

SUPPLY

An accurate estimate of the total growing stock is available for only a limited portion of the combined ranges of these two species. Because of scattered occurrence of these species, forest surveys usually include them in a group of other hardwood species of limited frequencies; consequently only rough estimates of timber volume are possible. The only region containing enough hackberry of sawtimber size to justify listing it separately is the Mississippi Delta. The three principal States producing commercial quantities of hackberry are Louisiana, Arkansas, and Mississippi. These States contain about 560 million cubic feet of growing stock and about 1,650 million board feet of sawtimber. About 44 percent of the total is in Louisiana and 33 percent in Arkansas. These States represent only a small portion of the combined range. In 1965 a rough estimate of the total sawtimber resource in the U.S. was in excess of 2,000 million board feet.

PRODUCTION

Production was less than 5 million board feet prior to 1940, but rose rapidly during World War II to a peak of 13 million board feet in 1942. This cut came from 17 States. The Mississippi Delta States of Arkansas, Louisiana, and Mississippi accounted for over 60 percent. Sugarberry probably made up most of this production. In 1946 lumber production of hackberry in 12 Southern States was about 18.6 million board feet. In 1960 hackberry used in United States manufacturing industries was approximately 17.9 million board feet and in 1965 it was about 50.1 million board feet. Veneer log production for 7 southern states is shown in table 1.

Hackberry is susceptible to sap stain during warm weather. There is little chance of damage if logs are quickly reduced to lumber. The use of water-spray systems permits safe storage of logs for about 30 days without degrade. Most lumber is treated with antistain chemicals.

Table 1.—*Veneer log production*

[Thousand bd. ft.]

Year	Alabama	Arkansas	Louisiana	Mississippi	Oklahoma	Tennessee	Texas	Total
1963....	1,249	736	138	843	—	204	320	3,490
1969....	879	594	130	157	64	15	363	2,202

CHARACTERISTICS AND PROPERTIES

Hackberry is a straight-grained, sometimes interlocked-grained, moderately hard wood with a specific gravity (ovendry) of 0.59. The sapwood is wide and varies in color from pale yellow to grayish or greenish yellow, frequently discolored with blue sap stain. The heartwood, when present, varies from yellowish gray to light brown streaked with yellow. Growth rings and wood rays are distinctly visible to the naked eye.

The wood is moderately strong in bending, moderately weak in compression parallel to the grain, and high in shock resistance, but lacks stiffness. It has moderately large to large shrinkage but keeps its shape well during seasoning. The wood has top-rated gluing properties. No difficulties are encountered in planing hackberry and it also ranks high in turning properties. It is intermediate in nail- and screw-holding ability, and it resists splitting from screws better than from nails.

The light color of the wood permits furniture manufacturers to use the light-to-medium brown finishes, usually achieved only by bleaching, without the extra costs and problems of bleaching. The moderate grain pattern makes hackberry highly desirable for solid parts in furniture where the large flat surfaces may be in fine face veneers such as walnut, butternut, and teak.

PRINCIPAL USES

Commercial use is predominately of sugarberry. The better grades are used principally for furniture, and to a lesser extent millwork, and sporting and athletic goods. Low-grade lumber is made up largely into boxes and crates. Veneer is used mainly in the manufacture of containers and interior plywood faces.

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